COLUMBUS, Ohio -- CLIMATOLOGISTS call it the Little Ice Age; historians, the General Crisis.

During the 17th century, longer winters and cooler summers disrupted growing seasons and destroyed harvests across Europe. It was the coldest century in a period of glacial expansion that lasted from the early 14th century until the mid-19th century. The summer of 1641 was the third-coldest recorded over the past six centuries in Europe; the winter of 1641-42 was the coldest ever recorded in Scandinavia. The unusual cold that lasted from the 1620s until the 1690s included ice on both the Bosporus and the Baltic so thick that people could walk from one side to the other.

The deep cold in Europe and extreme weather events elsewhere resulted in a series of droughts, floods and harvest failures that led to forced migrations, wars and revolutions. The fatal synergy between human and natural disasters eradicated perhaps one-third of the human population.

There are two ways to consider the impact of climate change. We can predict the future based on current trends or we can study a well-documented episode of the past.

What happened in the 17th century suggests that altered weather conditions can have catastrophic political and social consequences. Today, the nation's intelligence agencies have warned of similar repercussions as the planet warms -- including more frequent but unpredictable crises involving water, food, energy supply chains and public health. States could fail, famine could overtake large populations and flood or disease could cross borders and lead to internal instability or international conflict.

Earth scientists have discerned three factors at work globally during the 17th century: increased volcanic eruptions, twice as many El Nino episodes (unusually warm ocean conditions along the tropical west coast of South America), and the virtual disappearance of sunspots, reducing solar output to warm the Earth.

The 17th century saw a proliferation of wars, civil wars and rebellions and more cases of state breakdown around the globe than any previous or subsequent age. Just in the year 1648, rebellions paralyzed both Russia (the largest state in the world) and France (the most populous state in Europe); civil wars broke out in Ukraine, England and Scotland; and irate subjects in Istanbul (Europe's largest city) strangled Sultan Ibrahim.

Climate alone did not cause all the catastrophes of the 17th century, but it exacerbated many of them. Outbreaks of disease, especially smallpox and plague, tended to be more common when harvests were poor or failed. When an uprising by Irish Catholics on Oct. 23, 1641, drove the Protestant minority from their homes, no one had foreseen a severe cold snap, with heavy frost and snow at a time and in a place that rarely has snow. Thousands of Protestants died of exposure, turning a political protest into a massacre that cried out for vengeance. Oliver Cromwell would later use that episode to justify his brutal campaign to restore Protestant supremacy in Ireland.

But the cold did take a more direct toll. Western Europe experienced the worst harvest of the century in 1648. Rioting broke out in Sicily, Stockholm and elsewhere when bread prices spiked. In the Alps, poor growing seasons became the norm in the 1640s, and records document the disappearance of fields, farmsteads and even whole villages as glaciers advanced to the farthest extent since the last Ice Age. One consequence of crop failures and food shortages stands out in French military records: Soldiers born in the second half of the 1600s were, on average, an inch shorter than those born after 1700, and those born in the famine years were noticeably shorter than the rest.

Few areas of the world survived the 17th century unscathed by extreme weather. In China, a combination of droughts and disastrous harvests, coupled with rising tax demands and cutbacks in government programs, unleashed a wave of banditry and chaos; starving Manchu clansmen from the north undertook a brutal conquest that lasted a generation. North America and West Africa both experienced famines and savage wars. In India, drought followed by floods killed over a million people in Gujarat between 1627 and 1630. In Japan, a mass rebellion broke out on the island of Kyushu following several poor harvests. Five years later, famine, followed by an unusually severe winter, killed perhaps 500,000 Japanese.

No human intervention can avert volcanic eruptions, halt an El Nino episode or delay the onset of drought, despite the possibility that each could cause starvation, economic dislocation and political instability. But, unlike our ancestors who faced these changes 350 years ago, today we possess both the resources and the technology to prepare for them.

Britain's chief scientific officer has warned, for instance, that in the face of a seemingly inexorable rise in sea levels, ''We must either invest more in sustainable approaches to flood and coastal management or learn to live with increased flooding.'' In short, we have only two choices: pay to prepare now -- or prepare to pay much more later.

The experience of Somalia provides a terrible reminder of the consequences of inaction. Drought in the region between 2010 and 2012 created local famine, exacerbated by civil war that discouraged and disrupted relief efforts and killed some 250,000 people, half of them under the age of 5.

In the 17th century, the fatal synergy of weather, wars and rebellions killed millions. A natural catastrophe of analogous proportions today -- whether or not humans are to blame -- could kill billions. It would also produce dislocation and violence, and compromise international security, sustainability and cooperation.

So while we procrastinate over whether human activities cause climate change, let us remember the range of climate-induced catastrophes that history shows are inevitable -- and prepare accordingly.

CCSS ELA

[CCSS.ELA-LITERACY.RI.8.1](http://www.corestandards.org/ELA-Literacy/RI/8/1/)

Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.

[CCSS.ELA-LITERACY.RI.8.4](http://www.corestandards.org/ELA-Literacy/RI/8/4/)

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

NGSS

[CCSS.ELA-LITERACY.RI.8.4](http://www.corestandards.org/ELA-Literacy/RI/8/4/)

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

Questions

1. Why, according to the article, did the British chief scienctific office warn “In short, we have only two choices: pay to prepare now -- or prepare to pay much more later.”
2. Why, according to the article, do we need to prepare for future disasters?
3. Cite evidence from the article that indicates how large populations of people were impacted by The Little Ice Age.
4. Based on the article, what do you think “A natural catastrophe of analogous proportions today” would mean?
5. According to the author, why did bread prices spike in Italy?